IN THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Original) A computer-implemented method for determining from an input color filter array (CFA) sampled image, an edge direction, the method comprising:

calculating for a current missing green pixel, interpolation errors in an East-West (EW) direction at known neighboring green pixels, and averaging the EW interpolation errors to obtain an EW error;

calculating for the current missing green pixel, interpolation errors in a North-South (NS) direction at known neighboring green pixels, and averaging the NS interpolation errors to obtain a NS error; and

selecting a direction indicated by a minimum of the EW error and the NS error as the edge direction.

2. (Previously Presented) The method of claim 1 wherein the selected edge direction and the sampled image, which includes a green channel (G) of green pixels, a red channel (R) of red pixels, and a blue channel (B) of blue pixels, are used to interpolate missing green pixels at red and blue locations in the green channel by:

for the missing green pixel, interpolating a difference image comprising the G-B if the missing green pixel is in a blue location, or G-R if the missing green pixel is in a red location, in the selected edge direction;

in the blue channel, estimating missing blue pixels in green pixel locations using linear interpolation of the blue pixels in the blue channel in the selected edge direction; and

in the red channel, estimating the missing red pixels in green pixel locations using linear interpolation of the red pixels in the red channel in the selected direction, thereby providing an interpolated full green channel in which all missing green pixels have an interpolated value.

3. (Original) The method of claim 2 wherein the sampled image and the full green channel are used to correct the green channel by:

calculating the EW and NS interpolation errors for each pixel in the full green channel;

averaging neighboring EW and NS errors at each green pixel;

selecting the green local edge direction EW or NS based on the EW and NS average errors having a smallest value;

estimating the green pixels at blue pixel locations using linear interpolation of G-B in the selected direction, and wherein the missing blue pixels are interpolated in the selected direction; and

estimating the green pixels at red pixel locations using linear interpolation of G-R in the selected direction, and wherein the missing red pixels are interpolated in the selected direction.

4. (Original) The method of claim 2 wherein the sampled image and the full green channel are used to interpolate the red and blue pixels to obtain a quincunx sampling by:

using the full green channel to estimate a local EW or NS edge direction by calculating errors in interpolation in EW and NS directions at each pixel;

labeling each pixel's direction as one of EW or NS based on a minimum of the EW and NS average errors in a neighborhood of the current green pixel;

at missing red quincunx samples, interpolating R-G in the direction of the label; and

at missing blue quincunx samples, interpolating B-G in the direction of the label.

5. (Original) The method of claim 2 wherein the quincunx sampled red and blue channels and the full green channel are used to interpolate the red and blue pixels to obtain full red and blue channels by:

using the full green channel to estimate a NE or NW edge direction by calculating errors in interpolation in NE and NW directions at each pixel;

labeling each pixel's direction as one of NE or NW based on a minimum of NE and NW average errors in a neighborhood of the current green pixel;

at the missing quincunx samples interpolating R-G in the direction of the local label; and

at the missing quincunx samples interpolating B-G in the direction of the local label.

6. (Previously Presented) The method of claim 2 wherein corrected high density red, green, and blue channels are obtained from the input full red, green, and blue channels by:

using the G-R channel to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-R channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-R in the direction of the label;

adding the red channel to the interpolated G-R to obtain a G_R channel;

using the G-B channel to estimate local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-B channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-B in the direction of the label;

adding the blue channel to the interpolated G-B to obtain the G_B channel;

averaging the G_R and G_B channels in order to obtain a new green channel (G_{new});

calculating $R-G_{new}$ channel;

using $R-G_{new}$ to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating $R-G_{new}$ in the direction of the label;

adding the new green channel to the interpolated R-G_{new} to obtain a new red channel;

calculating B-G_{new};

using B-G_{new} to estimate local EW, NE, NS, or NW edge direction by calculating the errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating B-G_{new} in the direction of the label; and

adding the new green channel to the interpolated B-G_{new} to obtain a new blue channel.

7. (Original) A computer-implemented method for obtaining corrected high-density red (R), green (G), and blue (B) channels from interpolated red, green, and blue channels from an input color filter array (CFA) sampled image, the method comprising:

calculating a G-R channel;

using the G-R channel to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-R channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-R in the direction of the label;

adding the red channel to the interpolated G-R to obtain a G_R channel;

calculating the G-B channel;

using the G-B channel to estimate local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-B channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-B in the direction of the label;

adding the blue channel to the interpolated G-B to obtain the G_B channel;

averaging the G_R and G_B channels in order to obtain a new green channel (G_{new});

calculating $R\text{-}G_{new}$ channel;

using $R\text{-}G_{new}$ to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating $R\text{-}G_{new}$ in the direction of the label;

adding the new green channel to the interpolated $R\text{-}G_{new}$ to obtain a new red channel;

calculating $B\text{-}G_{new}$;

using $B\text{-}G_{new}$ to estimate local EW, NE, NS, or NW edge direction by calculating the errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating $B\text{-}G_{new}$ in the direction of the label; and

adding the new green channel to the interpolated $B\text{-}G_{new}$ to obtain a new blue channel.

8. (Previously Presented) A computer-readable medium comprising program instructions for determining from an input color filter array (CFA) sampled image, an edge direction, wherein the program instructions are computer-executable to implement a method for:

calculating for a current missing green pixel, interpolation errors in an East-West (EW) direction at known neighboring green pixels, and averaging the EW interpolation errors to obtain an EW error;

calculating for the current missing green pixel, interpolation errors in a North-South (NS) direction at known neighboring green pixels, and averaging the NS interpolation errors to obtain a NS error; and

selecting a direction indicated by a minimum of the EW error and the NS error as the edge direction.

9. (Previously Presented) The computer-readable medium of claim 8 wherein the program instructions are further executable to implement a method for using the selected edge direction and the sampled image, which includes a green channel (G) of green pixels, a red channel (R) of red pixels, and a blue channel (B) of blue pixels, to interpolate missing green pixels at red and blue locations in the green channel by:

for the missing green pixel, interpolating a difference image comprising the G-B if the missing green pixel is in a blue location, or G-R if the missing green pixel is in a red location, in the selected edge direction;

in the blue channel, estimating missing blue pixels in green pixel locations using linear interpolation of the blue pixels in the blue channel in the selected edge direction; and

in the red channel, estimating the missing red pixels in green pixel locations using linear interpolation of the red pixels in the red channel in the selected direction, thereby providing an interpolated full green channel in which all missing green pixels have an interpolated value.

10. (Previously Presented) The computer-readable medium of claim 9 wherein the program instructions are further executable to implement a method for using the sampled image and the full green channel to correct the green channel by:

calculating the EW and NS interpolation errors for each pixel in the full green channel;

averaging neighboring EW and NS errors at each green pixel;

selecting the green local edge direction EW or NS based on the EW and NS average errors having a smallest value;

estimating the green pixels at blue pixel locations using linear interpolation of G-B in the selected direction, and wherein the missing blue pixels are interpolated in the selected direction; and

estimating the green pixels at red pixel locations using linear interpolation of G-R in the selected direction, and wherein the missing red pixels are interpolated in the selected direction.

11. (Previously Presented) The computer-readable medium of claim 9 wherein the program instructions are further executable to implement a method for using the input sampled image and the full green channel to interpolate the red and blue pixels to obtain a quincunx sampling by:

using the full green channel to estimate a local EW or NS edge direction by calculating errors in interpolation in EW and NS directions at each pixel;

labeling each pixel's direction as one of EW or NS based on a minimum of the EW and NS average errors in a neighborhood of the current green pixel;

at missing red quincunx samples, interpolating R-G in the direction of the label; and

at missing blue quincunx samples, interpolating B-G in the direction of the label.

12. (Previously Presented) The computer-readable medium of claim 9 wherein the program instructions are further executable to implement a method for using the quincunx sampled red and blue channels and the full green channel to interpolate the red and blue pixels to obtain full red and blue channels by:

using the full green channel to estimate a NE or NW edge direction by calculating errors in interpolation in NE and NW directions at each pixel;

labeling each pixel's direction as one of NE or NW based on a minimum of NE and NW average errors in a neighborhood of the current green pixel;

at the missing quincunx samples interpolating R-G in the direction of the local label; and

at the missing quincunx samples interpolating B-G in the direction of the local label.

13. (Previously Presented) The computer-readable medium of claim 9 wherein the program instructions are further executable to implement a method for obtaining the corrected high density red, green, and blue channels from the input full red, green, and blue channels by:

using the G-R channel to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-R channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-R in the direction of the label;

adding the red channel to the interpolated G-R to obtain a G_R channel;

using the G-B channel to estimate local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-B channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-B in the direction of the label;

adding the blue channel to the interpolated G-B to obtain the G_B channel;

averaging the G_R and G_B channels in order to obtain a new green channel (G_{new});

calculating R-G_{new} channel;

using R-G_{new} to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating R-G_{new} in the direction of the label;

adding the new green channel to the interpolated R-G_{new} to obtain a new red channel;

calculating B-G_{new};

using B-G_{new} to estimate local EW, NE, NS, or NW edge direction by calculating the errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating B-G_{new} in the direction of the label; and

adding the new green channel to the interpolated B-G_{new} to obtain a new blue channel.

14. (Original) An electronic device, comprising:

an input color filter array (CFA) for filtering light at a time of image capture;

a charge coupled device (CCD) for sensing the filitered light to produce a sampled image;

a processor for processing the sampled image; and

an edge directed demosaicing algorithm executed by the processor for:

calculating for a current missing green pixel, interpolation errors in an East-West (EW) direction at known neighboring green pixels, and averaging the EW interpolation errors to obtain an EW error;

calculating for the current missing green pixel, interpolation errors in a North-South (NS) direction at known neighboring green pixels, and averaging the NS interpolation errors to obtain a NS error; and

selecting a direction indicated by a minimum of the EW error and the NS error as the edge direction.

15. (Previously Presented) The electronic device of claim 14 wherein the selected edge direction, the sampled image, which includes a green channel (G) of green pixels, a red channel (R) of red pixels, and a blue channel (B) of blue pixels, are used to interpolate missing green pixels at red and blue locations in the green channel by:

for the missing green pixel, interpolating a difference image comprising the G-B if the missing green pixel is in a blue location, or G-R if the missing green pixel is in a red location, in the selected edge direction;

in the blue channel, estimating missing blue pixels in green pixel locations using linear interpolation of the blue pixels in the blue channel in the selected edge direction; and

in the red channel, estimating the missing red pixels in green pixel locations using linear interpolation of the red pixels in the red channel in the selected direction, thereby providing an interpolated full green channel in which all missing green pixels have an interpolated value.

16. (Original) The electronic device of claim 15 wherein the sampled image and the full green channel are used to correct the green channel by:

calculating the EW and NS interpolation errors for each pixel in the full green channel;

averaging neighboring EW and NS errors at each green pixel;

selecting the green local edge direction EW or NS based on the EW and NS average errors having a smallest value;

estimating the green pixels at blue pixel locations using linear interpolation of G-B in the selected direction, and wherein the missing blue pixels are interpolated in the selected direction; and

estimating the green pixels at red pixel locations using linear interpolation of G-R in the selected direction, and wherein the missing red pixels are interpolated in the selected direction.

17. (Original) The electronic device of claim 15 wherein the sampled image and the full green channel are used to interpolate the red and blue pixels to obtain a quincunx sampling by:

using the full green channel to estimate a local EW or NS edge direction by calculating errors in interpolation in EW and NS directions at each pixel;

labeling each pixel's direction as one of EW or NS based on a minimum of the EW and NS average errors in a neighborhood of the current green pixel;

at missing red quincunx samples, interpolating R-G in the direction of the label; and

at missing blue quincunx samples, interpolating B-G in the direction of the label.

18. (Original) The electronic device of claim 15 wherein the quincunx sampled red and blue channels and the full green channel are used to interpolate the red and blue pixels to obtain full red and blue channels by:

using the full green channel to estimate a NE or NW edge direction by calculating errors in interpolation in NE and NW directions at each pixel;

labeling each pixel's direction as one of NE or NW based on a minimum of NE and NW average errors in a neighborhood of the current green pixel;

at the missing quincunx samples interpolating R-G in the direction of the local label; and

at the missing quincunx samples interpolating B-G in the direction of the local label.

19. (Previously Presented) The electronic device of claim 15 wherein corrected high density red, green, and blue channels are obtained from the input full red, green, and blue channels by:

using the G-R channel to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-R channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-R in the direction of the label;

adding the red channel to the interpolated G-R to obtain a G_R channel;

using the G-B channel to estimate local EW, NE, NS, or NW edge direction by calculating errors in interpolation of the G-B channel in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating G-B in the direction of the label;

adding the blue channel to the interpolated G-B to obtain the G_B channel;

averaging the G_R and G_B channels in order to obtain a new green channel (G_{new});

calculating $R-G_{new}$ channel;

using $R-G_{new}$ to estimate a local EW, NE, NS, or NW edge direction by calculating errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating $R-G_{new}$ in the direction of the label;

adding the new green channel to the interpolated R-G_{new} to obtain a new red channel;

calculating B-G_{new};

using B-G_{new} to estimate local EW, NE, NS, or NW edge direction by calculating the errors in interpolation in the EW, NE, NS, and NW directions at each pixel;

labeling each pixel's direction as one of EW, NE, NS, or NW based on a minimum of the average errors in a neighborhood of the corresponding pixel;

interpolating B-G_{new} in the direction of the label; and

adding the new green channel to the interpolated B-G_{new} to obtain a new blue channel.

Claims 20-25 (Cancelled).

26. (Previously Presented) The computer-implemented method of claim 1, wherein averaging the EW interpolation errors comprises summing the EW interpolation errors and dividing a resultant sum by a number of EW interpolation errors summed together to obtain an EW error.

27. (Previously Presented) The computer-implemented method of claim 1, wherein averaging the EW interpolation errors comprises summing the EW interpolation errors to obtain an EW error without dividing a resultant sum by a number of EW interpolation errors summed together.